

Motion Correction

21.2.2005

Riku Klén

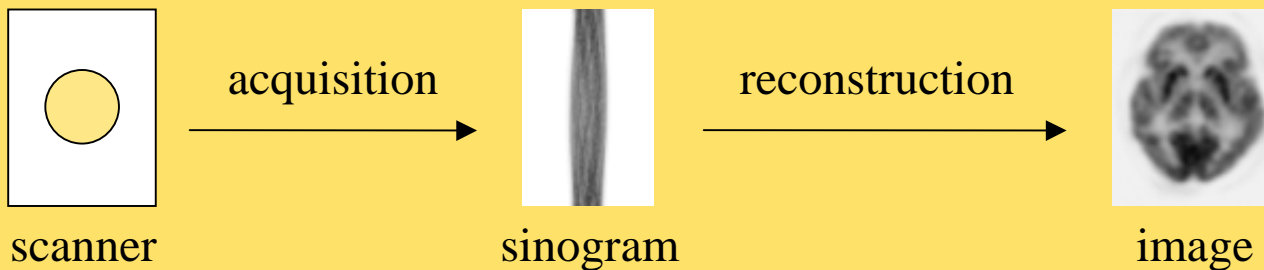
# Motion correction

List mode motion correction consists of

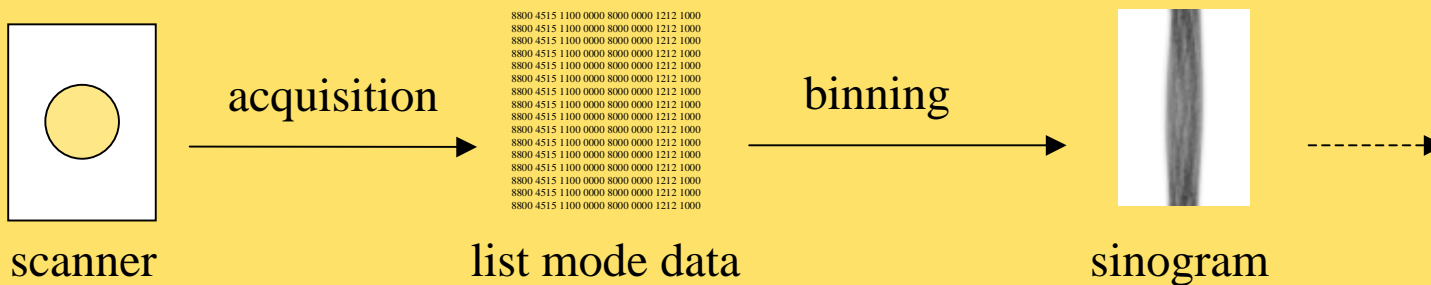
- list mode acquisition
- motion tracking
- motion correction

# What is list mode acquisition?

Normal acquisition (or frame mode acquisition)



List mode acquisition

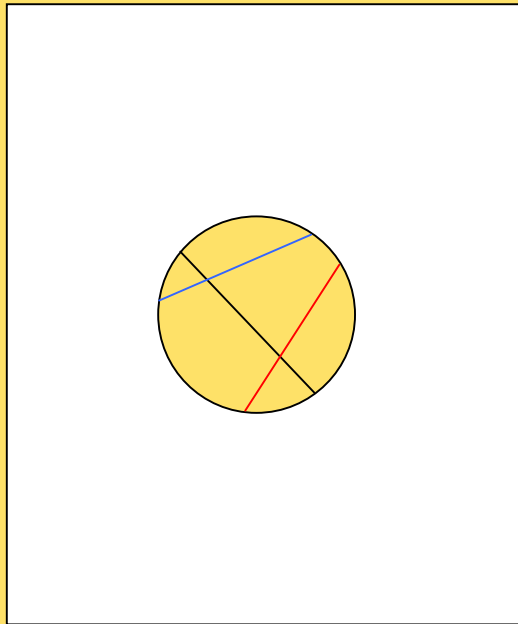


# Why list mode is needed?

- list mode data consists of events
  - every single event is stored
- list mode data is binned into sinograms
  - framing and gating can be defined after acquisition
- motion correction can be done inside each frame

# List mode acquisition

HR+



→	8800 4515 1100 0000 8000 0000 1212 1000
→	8800 3215 1100 3577 8000 3212 1184 1000
→	8800 8625 1100 5400 8000 1167 1844 1000

# Why track motion?

- motion of the patient cannot be avoided
  - motion of head can be minimised, but motion of chest is essential
- motion tracking gives more accurate information than mathematical modelling
  - head position is tracked with frequency of 20Hz
  - tracking accuracy is 0.5mm

# Polaris system



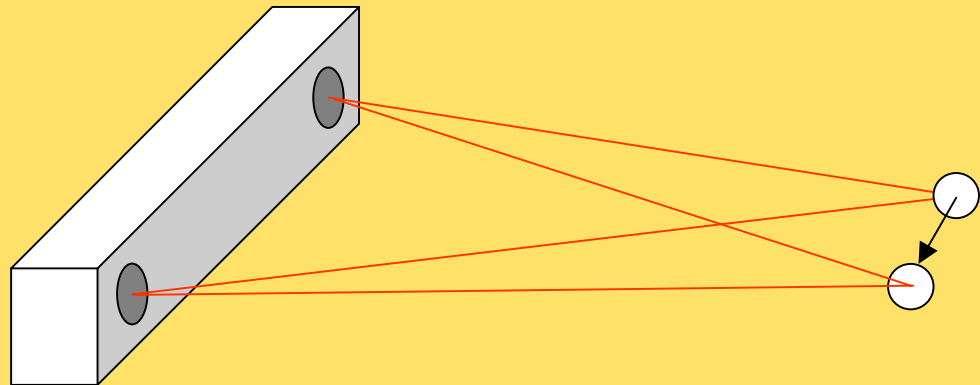
target

motion data

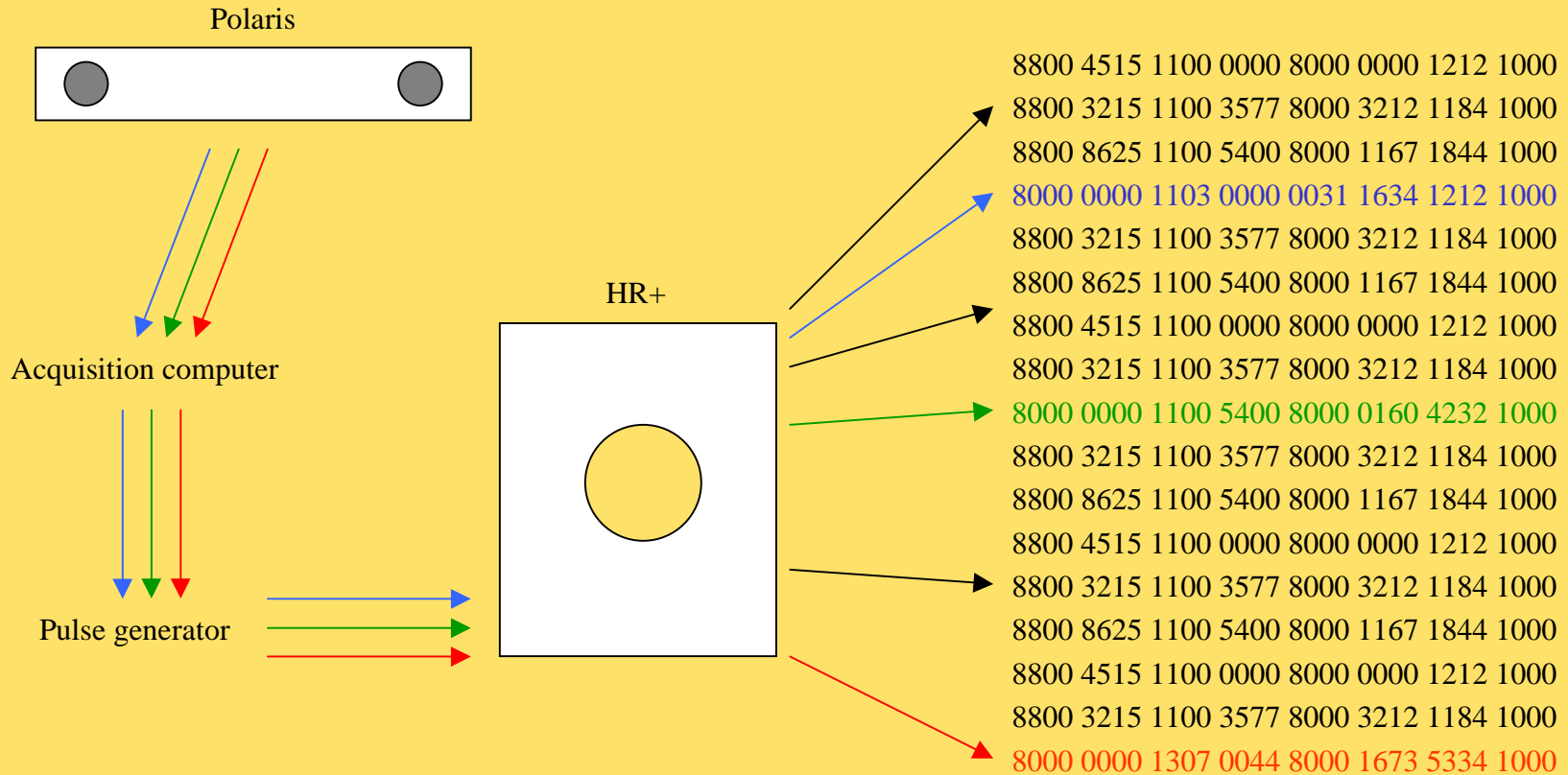
0 0 0

0 0 0

0 0 2



# Motion tracking



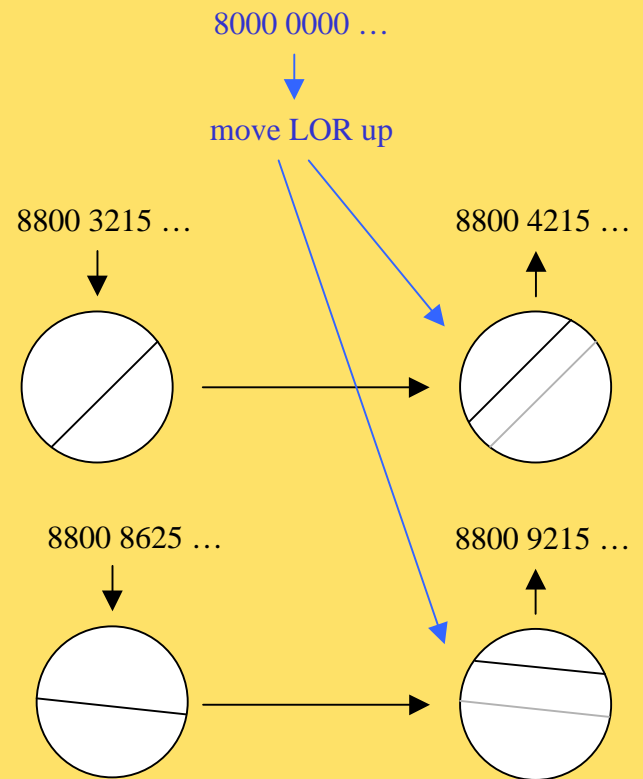
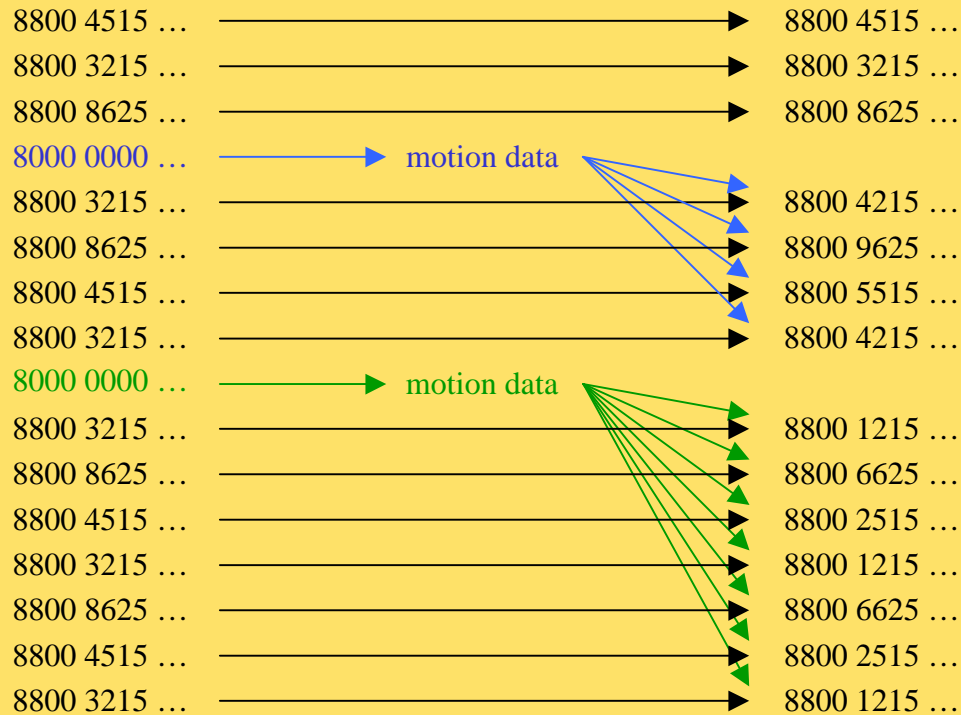
# How motion is corrected?

- motion correction is done for each event
  - each pair of detectors is transformed according to the motion
  - correction factors for attenuation and normalization are recalculated for corrected image

# Motion correction

Original list  
mode data

Motion corrected  
list mode data



# Status of motion correction

- list mode option for HR+ is ready and tested
  - new disk is installed
  - software for binning is written and tested
  - test reports are available in the new intranet
- Polaris system has been set up and tested
- pulse generator has been built and tested
- calibration software is written

# Future of motion correction

- acquisition software from Hammersmith should be ready soon
- motion correction software from Hammersmith is not yet finished
  - they have found problems in quantification

# Questions

Thank you for your attention.